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S&S® Cycle, Inc.
235 Causeway Blvd.
La Crosse, Wisconsin 54603
Phone: 608-627-1497 • Fax: 608-627-1488
Technical Service Phone: 608-627-TECH (8324)
Technical Service Email: sstech@sscycle.com
Website: www.sscycle.com

Because every industry has a leader

S&S® Cycle Guardian Diagnostic System Manual

DISCLAIMER:
S&S parts are designed for high performance, off road, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely effect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgement when performing installation and operating motorcycle. Good judgement begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgement. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.

WARNING

Means there is the possibility of injury to yourself or others.

CAUTION

Means there is the possibility of damage to the part or motorcycle.

NOTE

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

WARRANTY:
All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.
In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.
A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:
(1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
(2) S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.
(3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.
(4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

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INSTALLATION

Hardware Recommendations

A minimum of 64 MB of RAM is needed to run Guardian, 128 MB is recommended. You will need at least 300 MB of free space on your hard drive to install the program. A 450 MHZ Pentium® processor is required, but for optimum performance, a 1 GHZ Pentium® III processor is recommended.

Other requirements include:

- 9-pin serial port for communication with ignition module.
- CD-Rom for installation.
- Standard mouse and keyboard.

***NOTE**: If your computer does not have a 9-pin serial port, then a USB to Serial Adapter can be used. We have tested Guardian with the following USB to Serial Devices: IOGEAR GUC232A, ATEN UC232A, BAFO BF-810.*

Minimum Configuration Requirements

This section describes the minimum configuration requirements for a computer where Guardian is to be installed. If the minimum requirements are not met, the application setup will block the installation of Guardian. Specifically, note that you cannot install Guardian on a computer running the Microsoft® Windows® 98 or ME operating system.

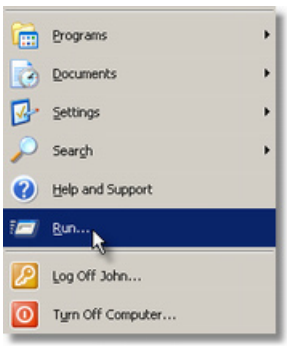
Platform and software minimum requirements to install Guardian; you must have one of the following operating systems with Microsoft Internet Explorer 5.01 or later installed on your computer (internet access is not required to install Guardian):

- Microsoft® Windows NT® 4 (Workstation or Server) with Service Pack 6a.
- Microsoft® Windows® 2000 (Professional, Server, or Advanced Server) with the latest Windows service pack and critical updates available from the Microsoft Security Web site (www.microsoft.com/security).
- Microsoft® Windows® XP (Home or Professional).
- Microsoft® Windows® Server 2003 family.

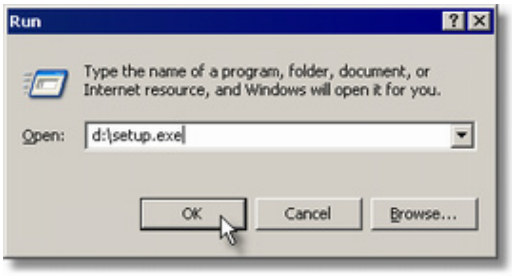
Installation

To install Guardian, perform the following:

1. Place your Guardian CD in your CD drive. The Guardian program should automatically begin installation. Proceed to step 10. If you have "Autoplay" disabled or the installation does not start, continue with the following procedure:
2. From your start menu, click on the "Run" menu item (your menu appearance may vary depending on the version of Windows® you're using).



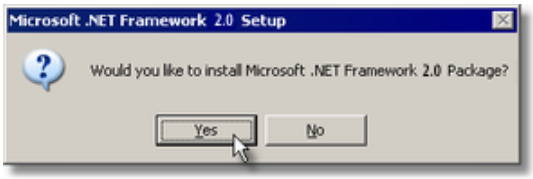
3. Type D:\Setup.exe in the Open box. You may need to replace the drive letter D: with the appropriate letter for the CD drive on your computer. Click on "OK" or press "ENTER" to continue.



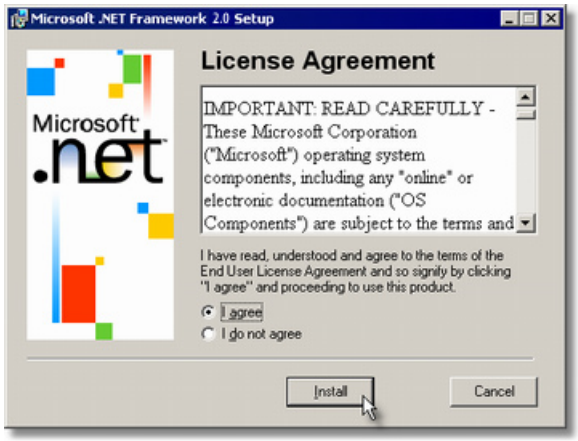
4. This message box may appear. If it does, click on "Yes" to install the required software. If it doesn't appear, proceed to step 10.

Windows Installer Loader
This setup requires the .NET Framework version VersionNumber. Please install the .NET Framework and run this setup again. The .NET Framework can be installed from the CD. Would you like to do this now?
Yes
No

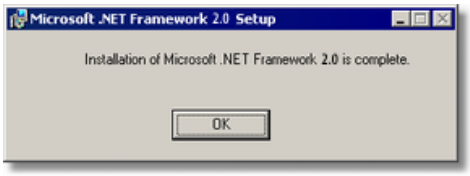
5. If you had to install the .NET Framework software in the previous step, confirm the installation by clicking on "Yes" when this message is displayed.



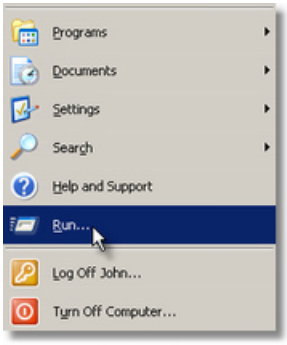
6. When this license agreement box appears, read the agreement, select "I agree", and click on "Install". If you do not agree with this agreement, click on "Cancel" to abort the installation. Guardian will not run without this .NET software installed on your computer.


Microsoft .NET Framework 2.0 Setup
License Agreement
Microsoft .net
IMPORTANT: READ CAREFULLY - These Microsoft Corporation ("Microsoft") operating system components, including any "online" or electronic documentation ("OS Components") are subject to the terms and
I have read, understood and agree to the terms of the End User License Agreement and so signify by clicking "I agree" and proceeding to use this product.
I agree
I do not agree
Install
Cancel

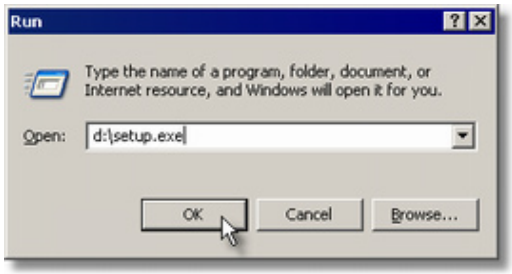
7. This message will appear when the .NET installation is complete. Click on "OK" to continue.



8. You can now install Guardian. From your start menu, click on the "Run" menu item.



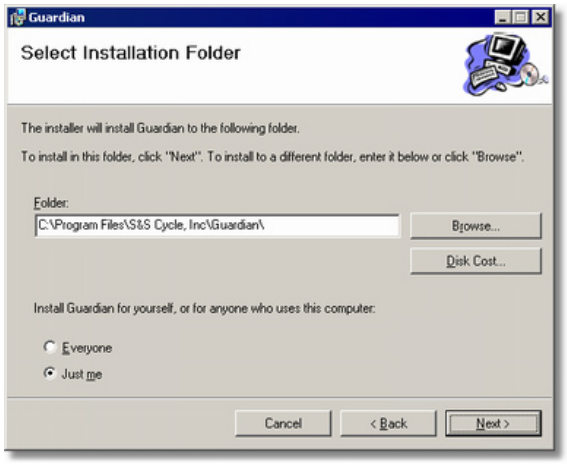
9. Type D:\Setup.exe in the "Open" box. You may need to replace the drive letter D: with the appropriate letter for the CD drive on your computer. Click on "OK" or press "ENTER" to continue.



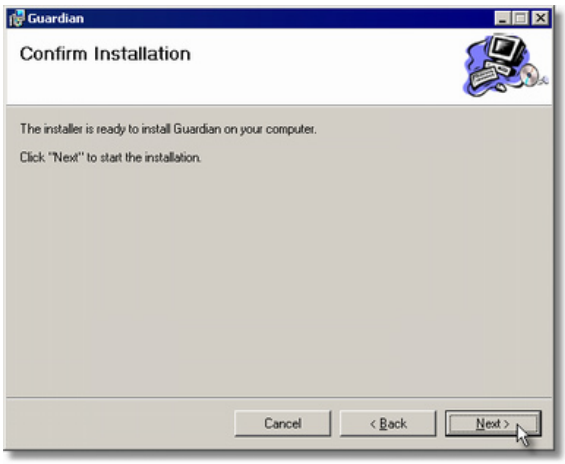
10. Click on "Next" to continue installing Guardian.

Guardian
Welcome to the Guardian Setup Wizard
The installer will guide you through the steps required to install Guardian on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

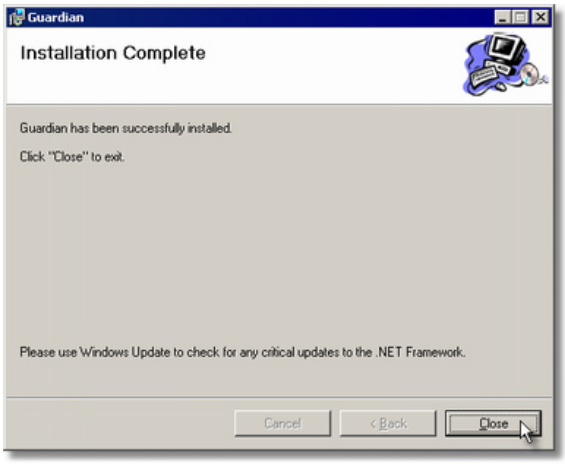
11. You can change the installation location for Guardian at this screen, but we recommend leaving it at the default location. Click on "Next" to continue.


Guardian
Select Installation Folder
The installer will install Guardian to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files\S&S Cycle, Inc\Guardian\
Browse...
Disk Cost...
Install Guardian for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

12. Confirm the installation by clicking on the "Next" button.


Guardian
Confirm Installation
The installer is ready to install Guardian on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

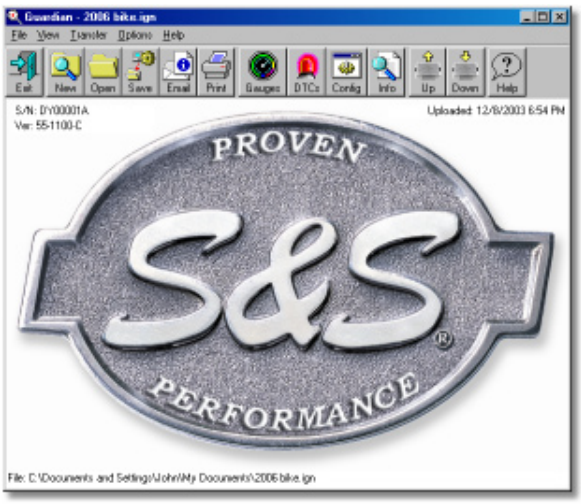
13. Click on "Close" to complete the installation.



14. A Guardian shortcut will appear on your desktop. You can also run Guardian from the "Programs/S&S/Guardian" menu.

INTRODUCTION

Guardian is a program that lets you easily view and change the parameters of your S&S® Cycle ignition system.



Here are the basics to using Guardian:

1. Connect serial cable to computer.
2. Connect serial cable to the diagnostic port on the Ignition Harness.
3. Apply power to IST Ignition Module.
4. Create a new configuration file.
5. Upload data from IST Ignition Module to computer.
6. Save file.
7. Make changes.
8. Save file (to save changes).
9. Download to IST Ignition Module.
10. Cycle Ignition Power to activate changes.

Using Help

The "Help" window is made up of two windows. Depending on whether the "Contents" tab, "Index" tab, or "Search" tab is active, the left window displays the table of Contents, Index, or Search result list. The right window shows the help topic linked to the entry in the left window and favorites tab.

To move through Help topics you've seen:

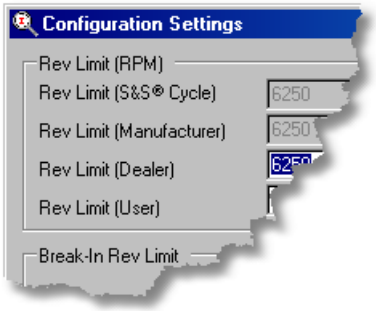
- On the "Help" toolbar, click "Back" to display the last Help topic you saw.
- On the "Help" toolbar, click "Forward" to display the next Help topic in a previously displayed sequence of topics.

To change the window size:

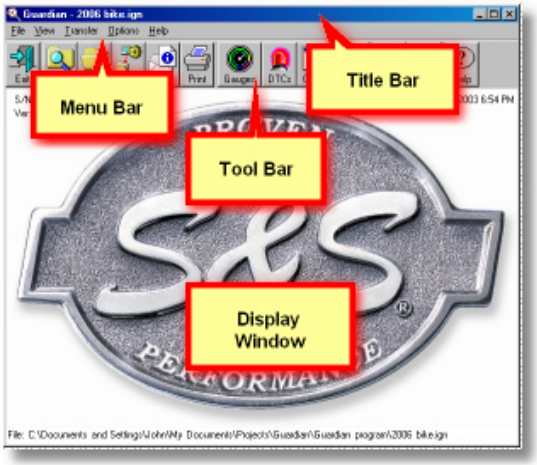
- To make the left or right wider or narrower, point to the divider between the two frames. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the divider right or left.
- To proportionally shrink or enlarge the whole "Help" window, point to any corner of the "Help" window. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the corner.
- To change the whole "Help" window's height or width, point to the top, bottom, left, or right edge of the "Help" window. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the side.

User Level
Different versions of Guardian have different user levels, with each level having access to different functions. If a function isn't available at your user level, the menu function will appear dimmed.

In this example, the current user can't change the S&S® or Manufacturer specified rev limits, but has access to change the dealer rev limit setting.



Main Screen
The Guardian Main Screen has four areas:



Title Bar- This shows you the file you are currently viewing, and has the standard Windows® command buttons, "Minimize", "Maximize", and "Close".

Menu Bar- This bar contains the basic menu items necessary to configure Guardian and manage your files.

Tool Bar - This has the command buttons you'll use to perform Guardian functions.

Display Window- Software version and filename information are displayed here.

Title Bar
The Title Bar displays the name of the file you are currently viewing, as well as the standard Windows® "Minimize", "Maximize", "Restore", and "Close" buttons.

- Use the (Minimize) button to reduce the window to a button on the taskbar. Click the taskbar button to open the window again.
- Use the (Maximize) button to enlarge the window so that it covers the entire desktop (except for the taskbar).
- Use the (Restore) button to return the window to its pre-maximized size.
- Use the (Close) button to close the window.

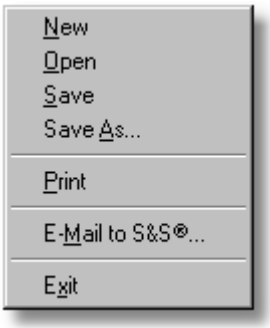
Tool Bar Buttons
The Tool Bar contains buttons to perform common functions within Guardian. Each button is assigned a unique function. Some of these functions are also available from the menu bar.

- Exit - Exits the Guardian program.
- New - Creates a new Guardian configuration file.
- Open - Opens an existing configuration file.
- Save - Saves the current configuration file.
- Email - Emails the current configuration file to S&S® Cycle technical support for evaluation.
- Print - Prints the current configuration information.
- Gauges - Displays the engine/ignition status gauges.
- DTCs - Displays the Diagnostic Trouble Codes.
- Config - Displays the current IST Ignition Module configuration.
- Info - Displays the current information stored in the IST Ignition Module, such as engine usage, rev limit, and version information.
- Up - Uploads data from the IST Ignition Module to your computer.
- Down - Downloads data from your computer to the IST Ignition Module.
- Help - Activates the "Help" file.

MENU BAR
The Menu Bar contains the menu items you'll use to create and manage your configuration files, and configure Guardian.

File Menu

Selecting File from the menu bar brings up the following menu selections:

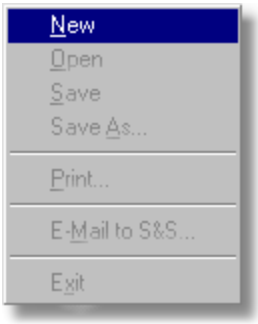


- New - Creates a new Guardian configuration file.
- Open - Opens an existing configuration file.
- Save - Saves the current configuration file.
- Save As - Lets you save the current configuration file under a different file name.
- Print - Prints the current configuration information.
- E-Mail to S&S® - Emails the current configuration file to S&S® Cycle Technical Support for evaluation.
- Exit - Exits the Guardian program.

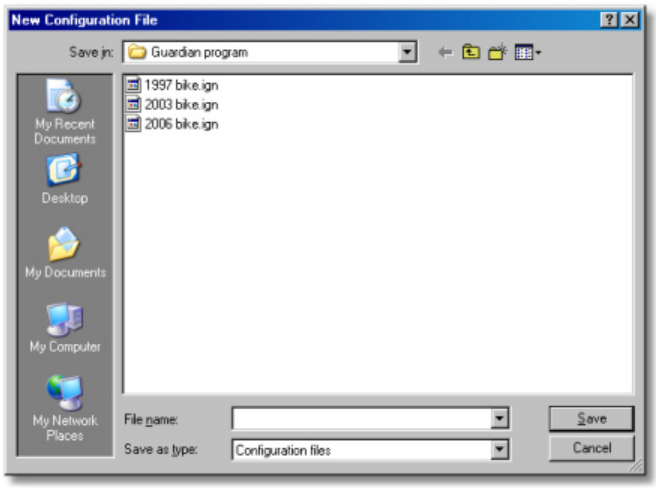
Create New File

To create a new file, select "New" from the menu bar or click on the

toolbar button to bring up the "New Configuration File" box.



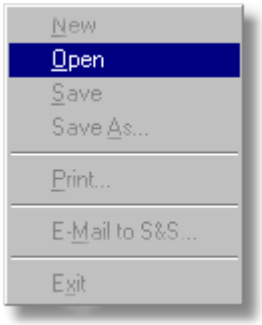
Enter a new file name in the "File Name" box, and click on "Save". This will create a new configuration file. You can change the directory that the file is saved in by clicking on the "Save In" box, and selecting the desired directory.



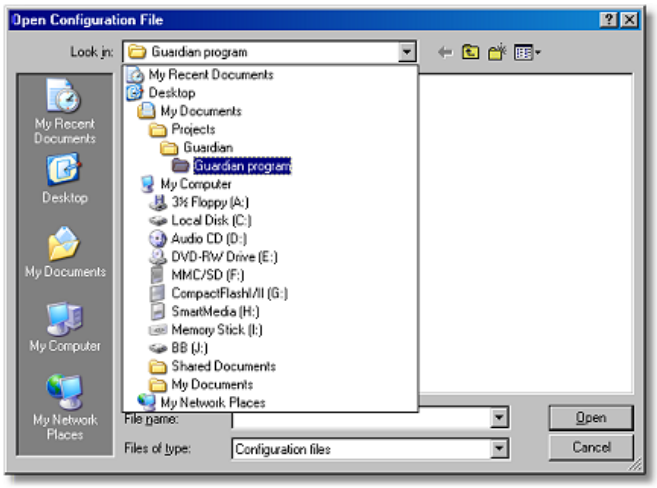
Open Existing File

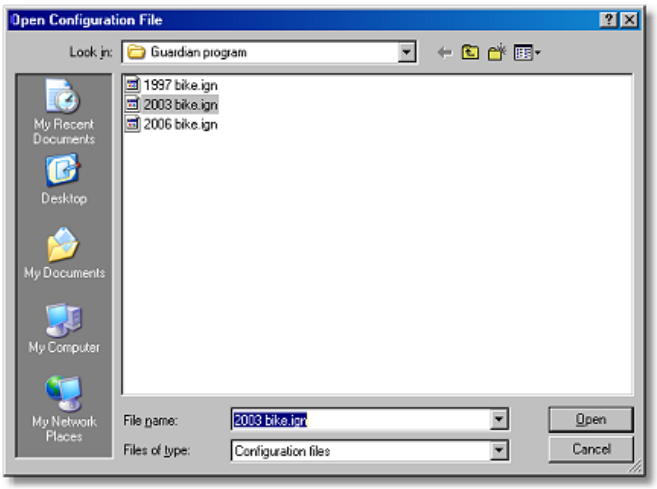
To open an existing file, click on the "Open" file menu item or click on the

tool bar button.



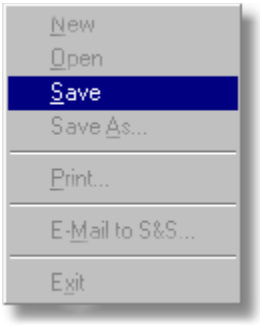
You can select the desired directory by clicking in the "Look In" directory box. Select the file name you want to open, and it will appear in the "File Name" box. Click "Open" or press "Enter" to open the file.



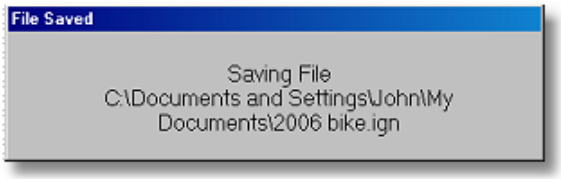


Save File
To save the current file, click on the "Save" file menu item, or click on the

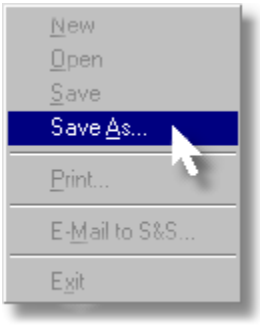
tool bar button.



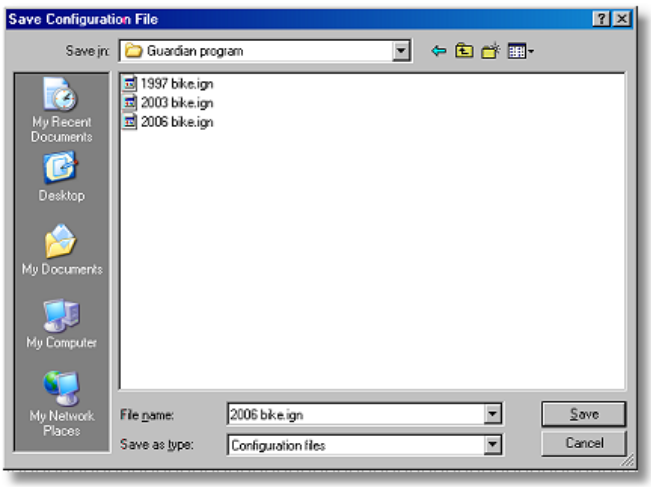
The file will be saved under the current file name.



Save File As
To save an existing file under a new file name, click on the "Save As" file menu item.



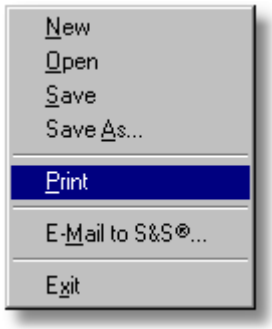
Type in a new file name in the "File Name" box, and click on "Save". Your current file will be saved under this new name.



The file name on the Title Bar will change to show this new filename.

Print Current Data File
To print the current file, click on the "Print" file menu item or click on the

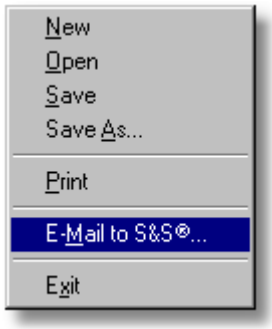
tool bar button.



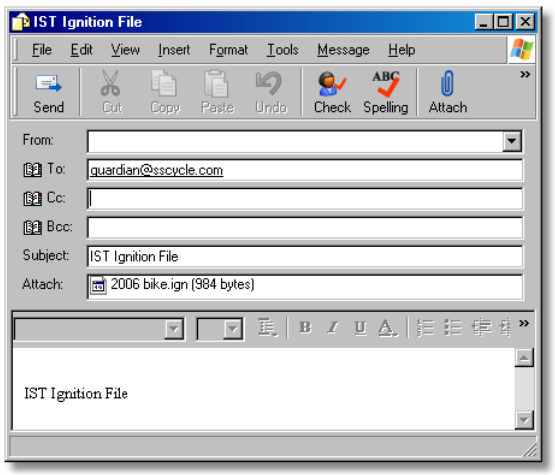
This will send the file to the default printer.

E-Mail Data File to S&S® Cycle
To send the current file to S&S® Technical Support for evaluation, click on the "E-Mail to S&S®" file menu item, or the

tool bar button.

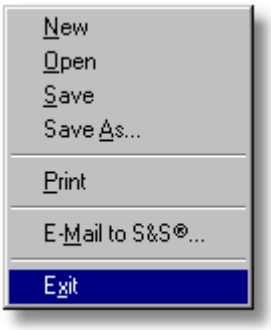


Guardian will create an email addressed to S&S® Technical Support with a copy of the current configuration file included as an attachment. You must have an email program such as Outlook® installed on your computer for this option to be functional. Click on the email "Send" button to send the message.



Exit

To Exit the Guardian program, click on the "Exit" file menu item or button on the toolbar.



View Menu

Selecting "View" from the menu bar brings up the following menu selections:

- Gauges - Displays the engine/ignition status gauges.
- DTCs - Displays the Diagnostic Trouble Codes.
- Config - Displays the current IST Ignition Module configuration.
- Info - Displays the IST Ignition Module information screen.

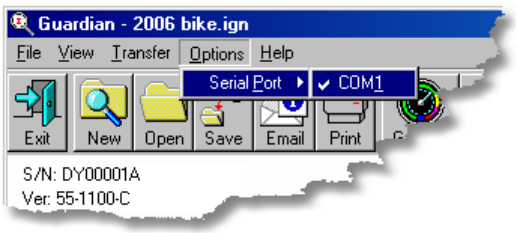
Transfer Menu

Selecting "Transfer" from the menu bar brings up the following menu selections:

- Upload FROM Module - Uploads data from the IST Ignition Module to your computer.
- Download TO Module - Downloads data from your computer to the IST Ignition Module.

Options Menu

Selecting "Options" from the menu bar brings up the following menu selections:



Guardian automatically determines which serial ports are available and displays those on the options menu. A check mark by the port indicates which communications port will be used by Guardian. Only the ports available on your computer are displayed.

Help Menu

Selecting "Help" from the menu bar brings up the following menu selections:

- Contents - Displays a directory tree of the "Help" contents file.
- Index - Allows you to perform a keyword search of the "Help" file.
- Search - Performs a word search, and displays a list of possible topic matches.
- About - Displays version and release date information on Guardian.

Find a Topic

In the "Help" menu, click one of the following items:

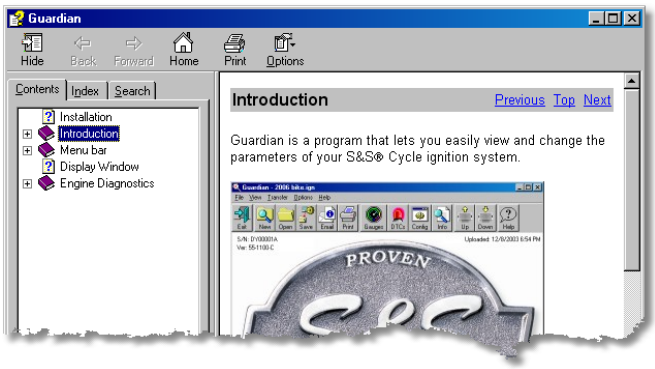
- To browse through topics by category, click the "Contents" tab.
- To see a list of index entries, click the "Index" tab, and then either type a word or scroll through the list.
- To search for words or phrases that may be contained in a "Help" topic, click the "Search" tab. In the left of the "Help" window click the topic, index entry, or phrase to display the corresponding topic in the right frame.

Change Help Window Size

- To make the left or right wider or narrower, point to the divider between the two frames. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the divider right or left.
- To proportionally shrink or enlarge the whole "Help" window, point to any corner of the "Help" window. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the corner.
- To change the whole "Help" window's height or width, point to the top, bottom, left, or right edge of the "Help" window. When the pointer changes to a double-headed arrow, hold down the left mouse button as you drag the side.

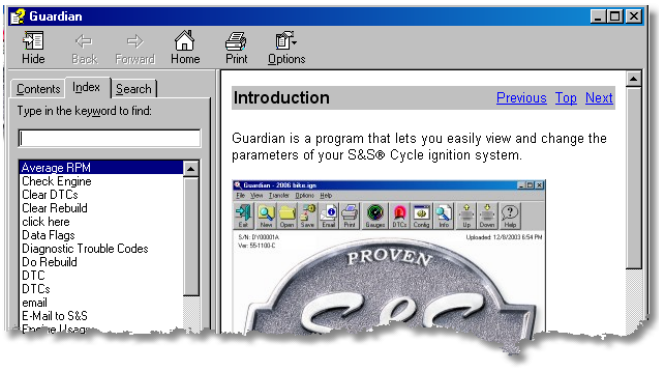
Contents

Selecting "Contents" from the "Help" menu displays the "Help Table of Contents" directory and associated topic information. Click on a topic in the left window to display the associated "Help" page in the right display window.



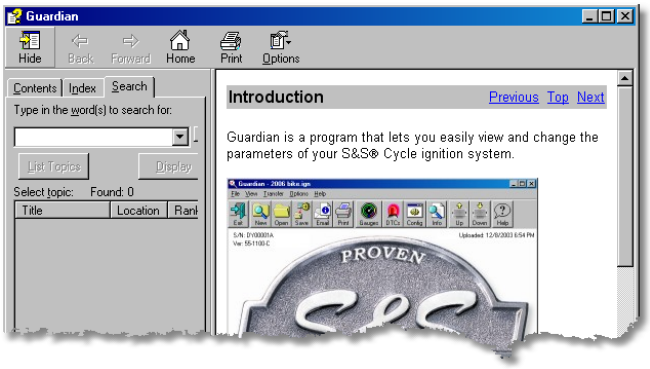
Index

Selecting "Index" from the "Help" menu displays the list of keywords in the "Help" file. Either type in a keyword, or select one from the list. The associated "Help" information will be displayed in the right window.



Search

Selecting "Search" from the "Help" menu will display the "Help Search" window. Type in a word to search for and click "List Topics". A list of possible topics is listed. You can select one by highlighting it and clicking on "Display". The "Help" information will be displayed in the right window.



About

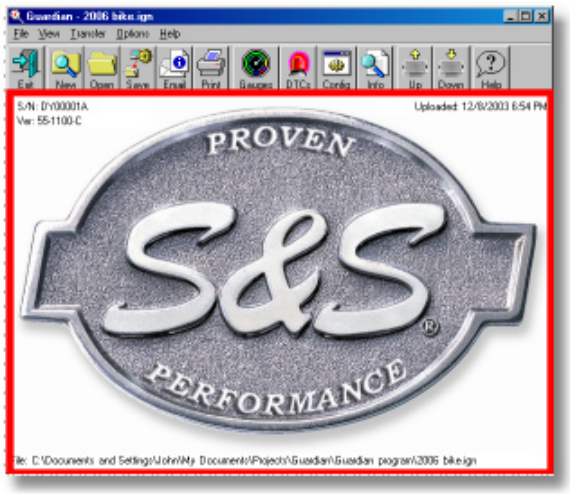
Selecting "About" from the "Help" menu will display the following:

About Guardian - 2006 bike.ign
Guardian
Version 1.4.2415.27528
Build Date: 8/12/2006 4:18 PM
Copyright © 2002-2006, S&S® Cycle, Inc. All Rights Reserved.
Portions Copyright © 1991-2002, ComponentOne, LLC. All Rights Reserved.
Portions Copyright © 2003, Global Majic Software, Inc. All Rights Reserved.
file:///C:/Program Files/S&S Cycle, Inc/Guardian/Guardian.exe
Access Level: Dealer
OK

Version and build date information is displayed, as well as the current filename and path of the program. The access level for the software is also shown. Click on "OK" to close this box.

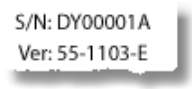
DISPLAY WINDOW

When Guardian opens, the display window appears on the main screen.

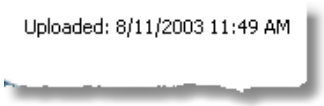


It shows you:

- IST Ignition Module serial number and software version.



- Date and time the data was last uploaded from the IST Ignition Module to your computer.



- Full path and filename of the configuration file currently loaded in Guardian (Guardian automatically loads the file you last used).

TRANSFERRING DATA

To transfer data between your computer and the IST Ignition Module you must first:

1. Connect the Guardian data cable to your PC's serial data port.

2. Connect the Guardian data cable to the diagnostic port on the Ignition Harness.
3. Run the Guardian program.
4. Upload data from the IST Ignition System to your computer.

Uploading data from the IST Ignition Module to your computer

To upload data from your IST Ignition Module to your computer, select "Upload From Module" from the "Transfer" file menu or click on the

tool bar button.

The following status box will show you the data upload progress:

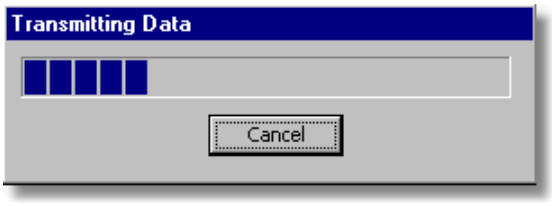
When complete, you can view the IST Ignition Module's data with Guardian. You can save the file by using the file menu's "Save File" or "Save File As" menu items.

Downloading data from your computer to the IST Ignition Module

To download data from your computer to your IST Ignition Module, select "Download To Module" from the "Transfer" file menu or click on the

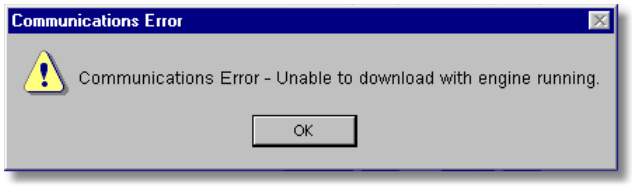
tool bar button.

The following status box will show you the data download progress:



COMMUNICATION ERRORS

If you experience errors while transferring data, check these possible causes:



Guardian will not transfer data while the engine is running. Turn off the engine, and turn the key to ON without starting the engine.

Check the cable connections between your computer and the ignition module. Verify power to the ignition module is ON.

ENGINE DIAGNOSTICS

Guardian helps you monitor your ignition system's operation and vital engine operating parameters. This information is provided by these Guardian functions:

The Gauges display shows you real-time operating conditions of your engine.

The DTC display shows you Diagnostic Trouble Codes.

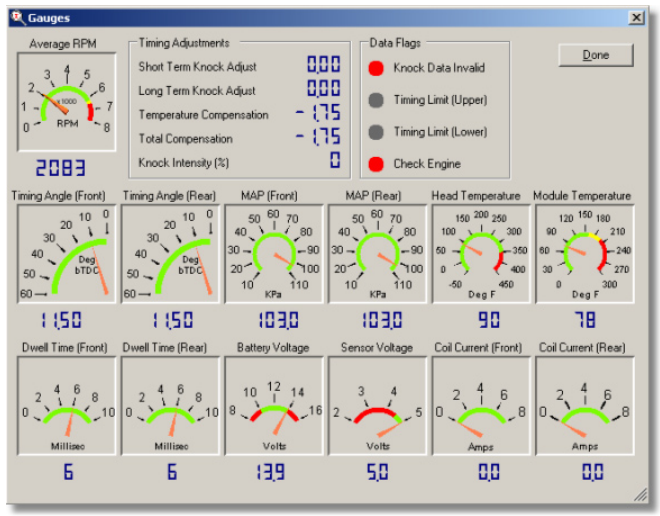
The Config display shows you the current configuration of the ignition module.

The Info display shows you historical data of your engine and module's performance.

Gauges

Clicking on the "Gauges" toolbar button brings up the "Gauges" display screen.

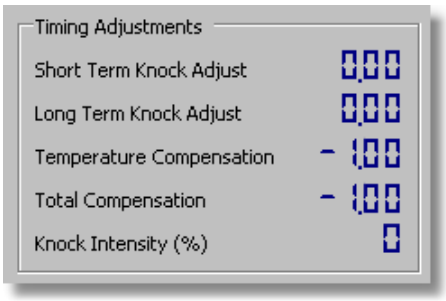
The "Gauges" display shows current "real-time" operational readings from the ignition system.



Average RPM

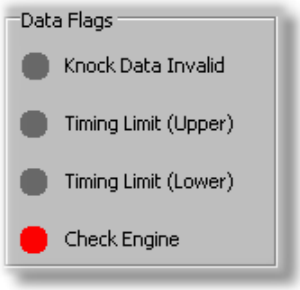
The "Average RPM" gauge shows the engine revolutions per minute, and is the same reading as shown on the motorcycle tachometer.

Timing Adjustments
This display shows the current software adjustments being applied to the vehicle ignition timing.



- Short Term Knock Adjust - Is an adjustment to timing based on current knock levels.
- Long Term Knock Adjust - Is an adjustment to timing based on engine history at this speed and engine load.
- Temperature Compensation - Is an adjustment to timing based on engine temperature.
- Knock Intensity - Is an indication of current knock level.

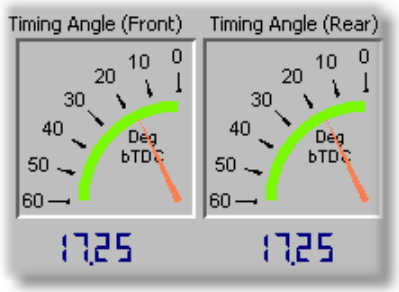
Data Flags
The Data Flags section displays information about current engine conditions including active engine fault codes (DTCs). These indicators turn RED if a condition requires your immediate attention.



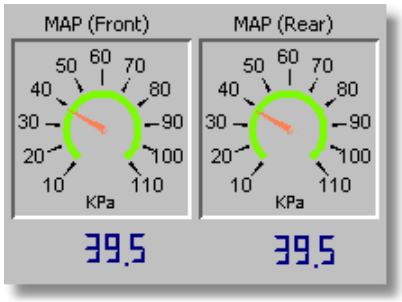
- Knock Data Invalid - This indicates that the current knock level readings are not being used for control. This is not a critical error but should be investigated.*
- Timing Limit (Upper) - This indicates that the current ignition timing is being limited to the upper timing limit safeguard built into the IST Ignition System. This is not a critical error indicator.
- Timing Limit (Lower) - This indicates that the current ignition timing is being limited to the lower timing limit safeguard built into the IST Ignition System. This is not a critical error indicator.
- Check Engine - This indicates that one or more engine Diagnostic Trouble Codes are set.

** **NOTE:** Knock data is often invalid at engine speeds above 4500 RPM due to excessive engine vibration. Timing adjustments made at lower engine speeds are used to adjust timing at higher speeds.*

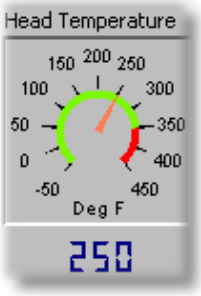
Timing Angle
This display shows you the current timing setting on both the front and rear cylinder. This is displayed as degrees before top dead center (bTDC).



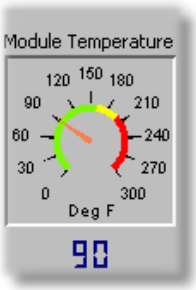
Manifold Absolute Pressure (MAP)
This is the Manifold Absolute Pressure, displayed in Kilo-Pascals (kPa). Typical wide-open throttle readings are about 100 kPa near sea-level. Idle is usually 30-40 kPa.



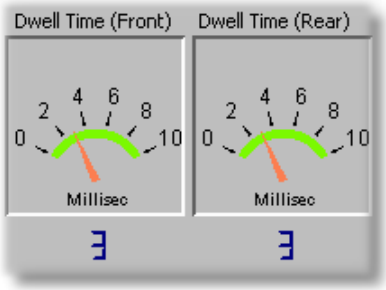
Head Temperature
This is the engine head temperature, measured in degrees Fahrenheit.



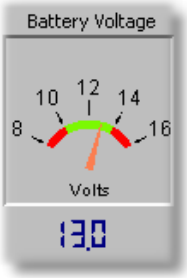
Module Temperature
This is the IST Ignition Module temperature, measured in degrees Fahrenheit.



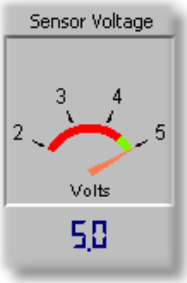
Dwell Time
This displays the amount of time that current flows through the primary of the ignition coil for each cylinder.



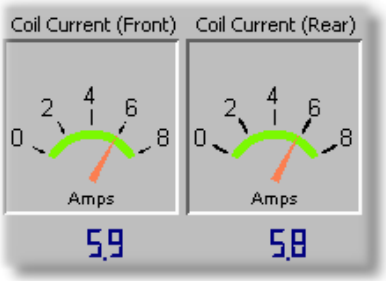
Battery Voltage
This is the voltage level of the motorcycle's battery and electrical system.



Sensor Voltage
This is the level of the voltage that is supplying the sensors on the motorcycle.



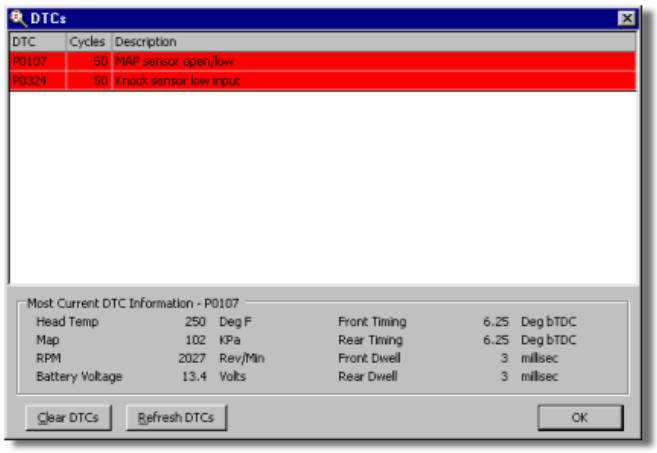
Coil Current
This is the amount of electrical current flowing through the ignition coils.



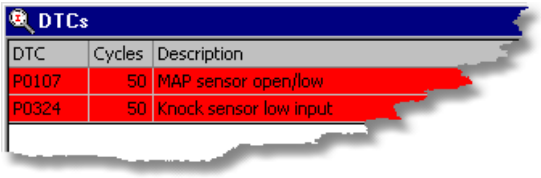
Diagnostic Trouble Codes (DTCs)
To view the engine Diagnostic Trouble Codes (DTCs), click on the

tool bar button.

The DTC display will show you all of the error codes displayed in the IST Ignition Module's memory. Current codes are highlighted in red. Historic codes are shown in white. "Cycles" indicates the number of key cycles needed to clear the code. This is an indicator of how many key cycles, or how long ago an error occurred.



The display shows you the current DTC code, Cycles, and a brief description of the error.



The engine sensor data at the time the most current DTC was set (such as RPM, voltage, etc.) is also displayed.

Most Current DTC Information - P0107
Head Temp 250 Deg F
Map 102 KPa
RPM 2027 Rev/Min
Battery Voltage 13.4 Volts
Front Timing 6.25 Deg bTDC
Rear Timing 6.25 Deg bTDC
Front Dwell 3 millisec
Rear Dwell 3 millisec

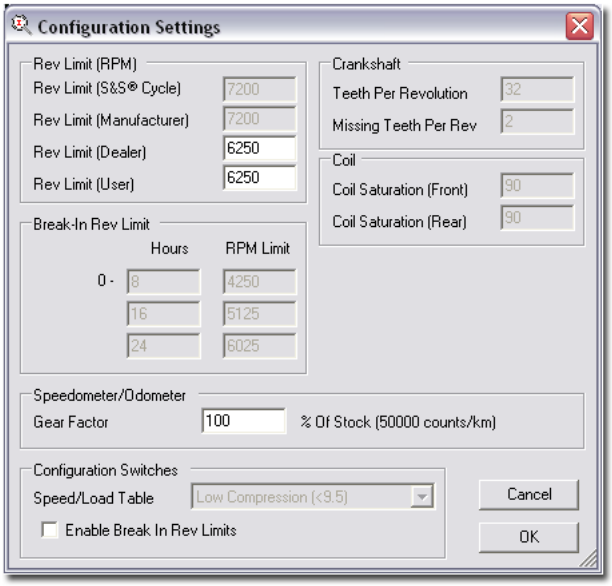
To clear the trouble codes from the IST Ignition Module's memory, click on the "Clear DTCs" button. To refresh the display to show the most current trouble codes, click on the "Refresh DTCs" button. When you are finish with this screen, click on "OK" to close the DTC window.

Configuration

To view the current ignition configuration, click on the tool bar button.

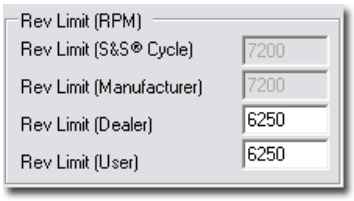
This display shows:

- Rev Limit
- Break-In Rev Limit
- Speedometer/Odometer
- Configuration Switches
- Coil and Crankshaft Configurations



Rev Limit

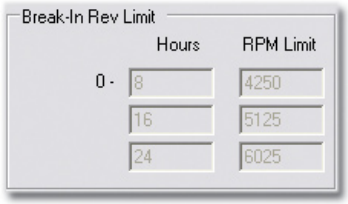
The "Rev Limit" display shows the current maximum RPMs that an engine is allowed to run at. You may be restricted from changing some of the rev limits based on your user level. Note that the IST Ignition Module will use the LOWEST of the displayed rev limits (including break-in rev limit when active) to determine the actual rev limit to be used. To see what rev limit is currently being used, upload the IST Ignition Module to your computer, select the "Info" tool bar button and look under the "Rev Limits" tab.



Break-In Rev Limit

The "Break-In Rev Limit" limits the maximum RPMs an engine can operate at, depending on the total amount of run-time on the engine. These limits are factory-set, and cannot be changed at the dealer user level. The break-in "Rev Limit" prevents accidental over-revving of the engine during the critical break-in hours and is one of the safety features of the IST Ignition System.

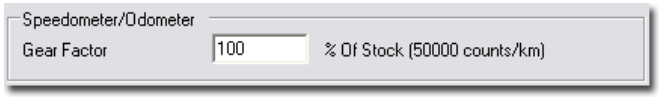
NOTE: *Not all engines have this feature activated. To determine the current rev-limit for your ignition, go to the "Rev Limit" tab on the "Info" screen.*



Speedometer/Odometer

The speedometer/odometer readings can be affected by modifications to your bike. The "Gear Factor" setting is used to adjust the calculation for both vehicle speed and mileage, accounting for changes in gear ratios and rear tire size. By default, "Gear Factor" is set to 100% of stock (50,000 counts/kilometer). The vehicle speed sensor's pulse count per kilometer is shown for the Gear Factor percentage entered in the program.

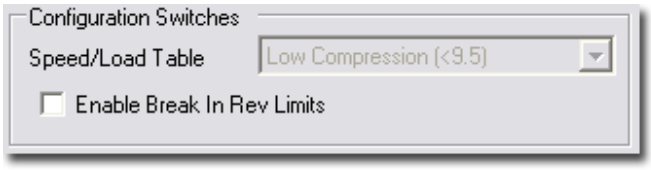
If Guardian is being used with an older Rev. B IST module, the "Gear Factor" window will appear grayed out and cannot be changed by the user. Note that the "Gear Factor" adjustment only has an effect on 2004 and up IST installations.



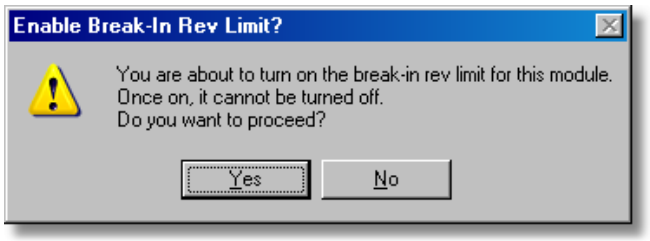
Configuration Switches

Speed/Load Table - This shows you which base timing map is being used in the IST Ignition Module. This is set by S&S® Cycle, and cannot be changed. In some cases, the ignition system may automatically select a different base timing map determined from timing adjustments made by the knock sensing system.

Enable Break In Rev Limits - You can enable the break-in rev limit settings by clicking on the "Enable Break In Rev Limits" box.

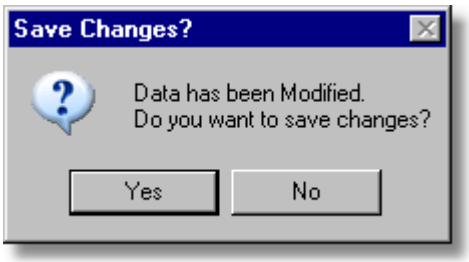


By doing this you will disable the "check box" so that it cannot be disabled again. A warning message will ask you to verify turning on the break-in rev limit for this ignition module. If you select "Yes", the break-in rev limit will be permanently enabled until a rebuild is performed.


Enable Break-In Rev Limit?
You are about to turn on the break-in rev limit for this module.
Once on, it cannot be turned off.
Do you want to proceed?
Yes
No

After selecting "Yes", the "Enable Break In Rev Limits" box will be disabled (grayed out). Select "Download To Module" to save this change to the IST.

If you make changes to the configuration settings, and then click "Cancel", you will be asked if you want to save your changes.



Select "Yes" to return to the previous screen so you can save your changes, or "No" to exit without saving.

Coil Configuration

Coil Saturation Constant is a value used to calculate the dwell time for charging the coil. It is used in conjunction with battery voltage to determine the dwell time. When the battery voltage is low, the dwell time is increased to compensate.

The coil configuration is calculated automatically by the IST Ignition System and cannot be changed at the dealer user level.

Information

To view the IST Ignition Module Information screen, click on the tool bar button.

The IST Ignition Module Information screen displays the historical data stored in the IST Ignition Module.

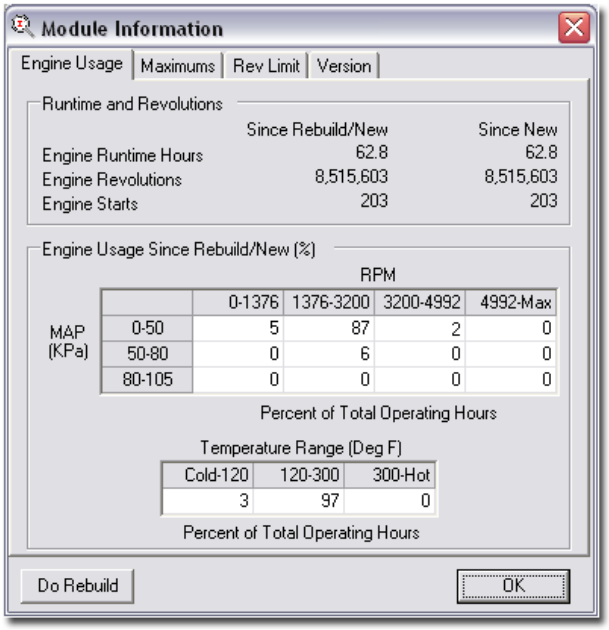
There are 4 different data display tabs available:

- Engine Usage
- Maximums
- Rev Limit
- Version

You can also reset this information with the "Do Rebuild" button.

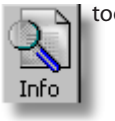
WARNING! USING THIS FUNCTION WILL VOID ANY REMAINING S&S® ENGINE WARRANTY!

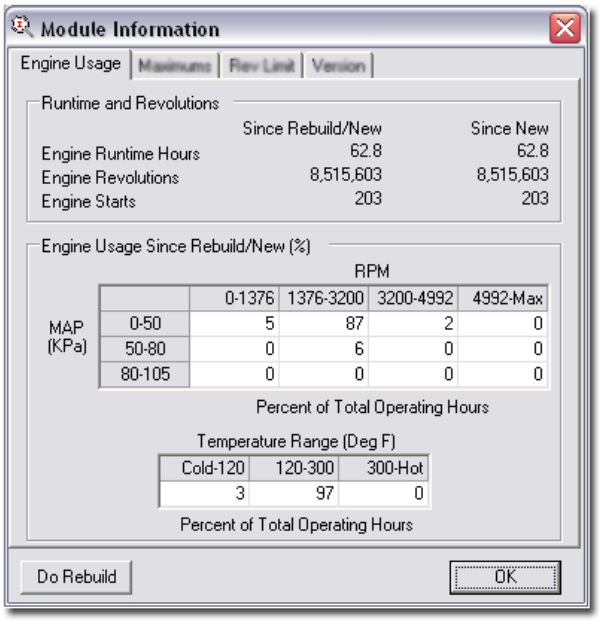
Click on the "OK" button to close this screen.



Engine Usage

To view the "Engine Usage" information, click on the tool bar button and select the "Engine Usage" tab.



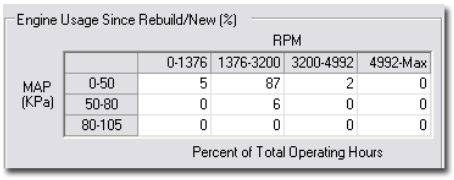


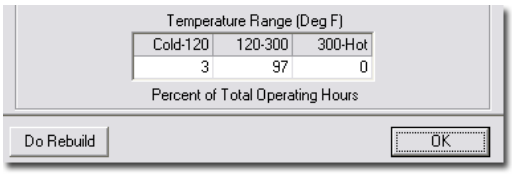
Runtime and Revolutions

This shows the number of hours an engine has run, along with the total number of revolutions and engine starts since it was new or rebuilt. The "Since Rebuild/New" data is reset to zero when the "Do Rebuild" function is performed.

Engine Usage Since Rebuild/New

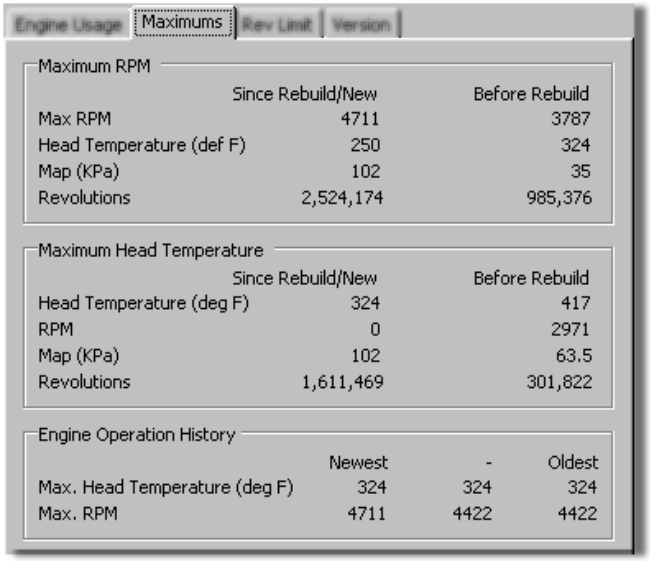
This shows the percentage of total operating hours in specific RPM and MAP ranges, along with a breakdown of the percentage of total operation at specific temperature ranges. This data is reset to zero when the "Do Rebuild" function is performed.





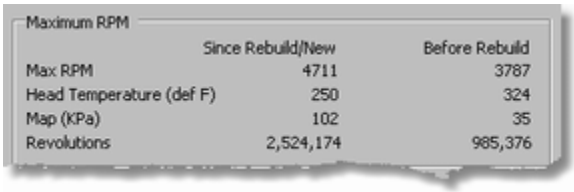
Maximums

To view the "Maximums" information, click on the tool bar button, and select the "Maximums" tab.



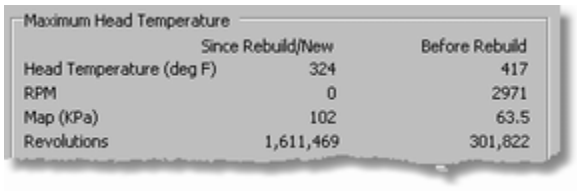
Maximum RPM

This displays the maximum RPM (revolutions per minute) reading since the engine was new or rebuilt. The head temperature, MAP, and revolution count that was recorded at the time the maximum RPM reading occurred is also displayed. This data is reset to zero when the "Do Rebuild" function is performed.



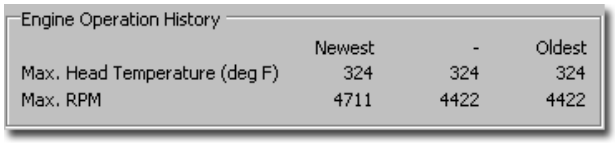
Maximum Head Temperature

This displays the maximum head temperature reading since the engine was new or rebuilt. The RPM, MAP, and revolution count that was recorded at the time the maximum head temperature reading occurred is also displayed. This data is reset to zero when the "Do Rebuild" function is performed.



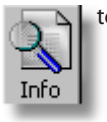
Engine Operation History

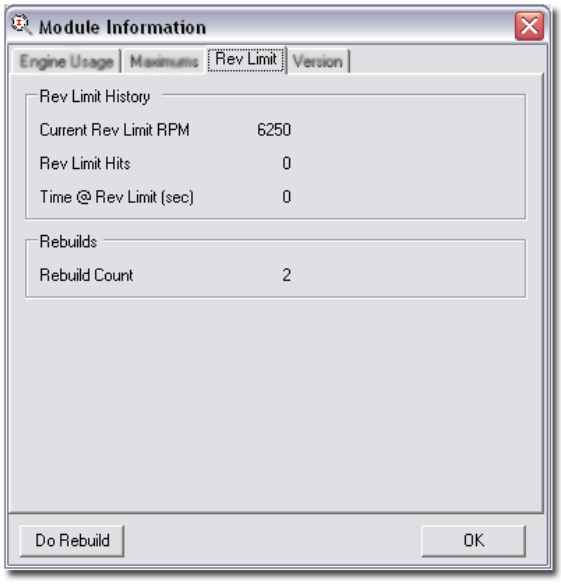
This displays the maximum head temperature and RPM readings that are stored in the IST Ignition Module for the last 3 periods of operation lasting at least 5 minutes. They are displayed "newest to oldest". This data is reset to zero when the "Do Rebuild" function is performed.



Rev Limits

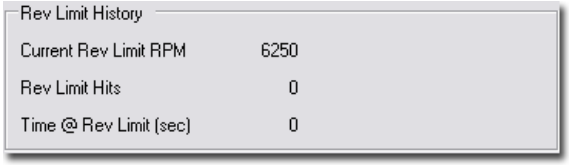
To view the "Rev Limit" information, click on the tool bar button, and select the "Rev Limit" tab.





Rev Limit History

The "Rev Limit History" shows the current RPM limit programmed into the IST Ignition Module. It also shows the number of times the RPM reading has hit this limit, and the total time the engine has been run at or above this limit. Note that if the break in "Rev-Limit" is enabled, the ignition system will not record rev-limit hits until the break-in period is over.

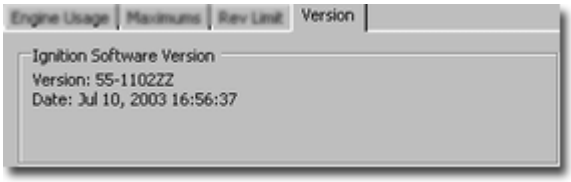


Rebuilds
This shows the number of times the engine has been rebuilt.

Version
To view the "Version" information, click on the

tool bar button and select the "Version" tab.

The Ignition Software Version shows you the software version and date of the ignition software. This is helpful if you need to contact S&S® Cycle for assistance.



Guardian Translator Info
Clicking on the "Guardian Translator Infomation" button will display the model, version number, date, and serial number of the Guardian Translator. Click on the "OK" button to close this display.

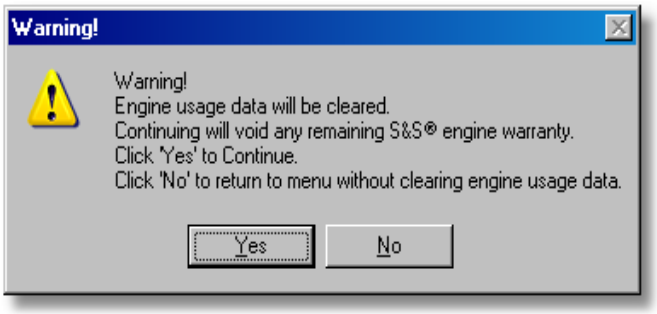
Do Rebuild
At the bottom of the Info screen is the **"Do Rebuild"** button.

WARNING! USING THIS FUNCTION WILL VOID ANY REMAINING S&S® ENGINE WARRANTY!

NOTE: *If your IST module was purchased with the Break-In Rev Limit enabled, performing a rebuild will re-enable Break-In Rev Limits.*

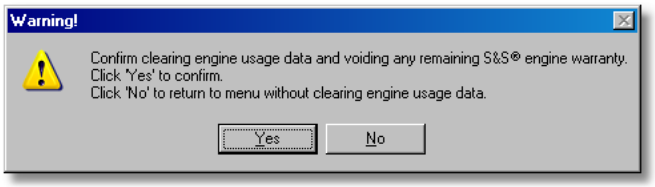
Clicking on the

button will bring up this warning message:


Warning!
Warning!
Engine usage data will be cleared.
Continuing will void any remaining S&S® engine warranty.
Click 'Yes' to Continue.
Click 'No' to return to menu without clearing engine usage data.
Yes
No

WARNING! SELECTING "YES" WILL VOID ANY REMAINING S&S® ENGINE WARRANTY!

If you choose to continue by clicking on "**Yes**", the following confirmation will appear. Click on "**No**" to return to the previous display without clearing the engine usage data.


Warning!
Confirm clearing engine usage data and voiding any remaining S&S® engine warranty.
Click 'Yes' to confirm.
Click 'No' to return to menu without clearing engine usage data.
Yes
No

After the engine usage data is cleared, click "OK" to return to the menu.

Usage Data Cleared
Engine usage data has been cleared.
(See Configuration screen for duration of break-in rev limit period).
OK